

Appl. No. 10/065,377
Response dated August 11, 2005

REMARKS

By this amendment, claim 2 is amended; new claim 19 is presented; and claims 1 – 19 are pending. Claims 1 - 3 currently stand rejected as obvious in view of *Owen*; claims 4 - 13 stand rejected as obvious in view of *Owen* and *Stegelman*; claims 14 – 18 were withdrawn from examination due to a restriction requirement; and claim 13 was noted as a linking claim. Further examination of the application, as amended and reconsideration of the rejections are respectfully requested.

No New Matter

Claim 2 is amended to correct a minor grammatical error so that there is antecedent basis for the collecting/returning step. New claim 19 has been added to specifically recite combustion of the slurry in the regenerator, support for which can be found, inter alia, in the specification at original paragraph [0014]. No new matter is presented by these amendments.

§ 103 Rejections

By way of background, the present invention provides a method and system for recovering fines from a light FCC-type effluent gas. Cracked gases from the reactor are cooled by direct contact with circulating oil in an oil quench tower. The circulating oil also washes out the catalyst fines carried with the reactor effluent gas. A flow of the oil from the quench tower bottoms is sent through one of a pair of filters to remove fines and recycle the oil to the tower. The other filter

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is in backwash operation using a compressed gas to remove the fines and forward them to a surge drum. Fuel oil or quench oil is added to the drum to form a slurry, which carries the catalyst fines to the regenerator where the oil is combusted to supply the FCC system heat requirements. Since a minimum amount of fuel oil is generated in the FCC, fuel oil is imported to inventory the quench tower.

Owen teaches a process for fluidized catalytic cracking comprising catalytically cracking a feed in the riser reactor, separating cracked product vapor and a spent catalyst, stripping and regenerating the spent catalyst to produce regenerated catalyst which is recycled to the riser reactor, contacting the hot cracked vapor product with a heavy quench liquid, and fractionating the quenched vapor product to recover catalytically cracked products. A heavy liquid, such as slurry oil from the main column, is removed from the bottom of the quench drum, is pumped through a cooler, and the cooled liquid is recycled to the quench drum for contacting with the hot vapor product. The quench liquid accumulates in a pool in the base of the quench drum. A large amount of catalyst fines will collect in the quench liquid (column 8, lines 21 – 22).

Initially, it is noted that conventional heavy-feed FCC art typified by *Owen* (and *Stegelman*) do not at all address the operation of FCC units with light feeds, nor the problems encountered by applicant in the processing of light-feed FCC effluents and the regeneration of catalysts in light-feed FCC processes. Applicant

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has found, quite surprisingly, that the FCC processing of light feeds requires an entirely contrary approach to conventional FCC processing.

Regarding claim 1, *Owen* does not teach or suggest applicant's step (a) of "supplying quench oil to a quench oil inventory to maintain the inventory in steady state." *Owen* instead is premised on the faulty assumption that the effluent will always contain excess heavy oil, and thus assumes that it is always necessary to remove excess oil from the inventory to maintain a steady state, an approach that fails to address the problems in applicant's process. Moreover, such a proposed modification would be clearly detrimental to the *Owen* process or even render it inoperative. *Owen* had no appreciation whatsoever of the problem solved by applicant of insufficient heavy oil in the effluent, and did not suggest any solution for it. The only teaching of this solution is found in applicant's own disclosure, and would require impermissible hindsight reconstruction for the wholesale modification of *Owen*, contrary to the clear teachings thereof, required to obtain applicant's presently claimed invention.

Nor does *Owen* teach or suggest recovering the fines in a filter and re-slurrying the recovered fines, as required in step (f). *Owen* only suggests that "some provision for fines removal should be provided" (column 8, lines 22 – 23), and that although filters and similar equipment can be used, "it will be preferred in many refineries to simply drag or remove a portion of this quench liquid and send

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it to the main column, which is already designed to accommodate this amount of fines production" (column 8, lines 23 -- 28). The mere suggestion in *Owen* that fines should be removed does not render the re-slurrying of the recovered fines obvious. There is no motivation apparent from *Owen* to filter the fines from the very plentiful oil and then undo all of the filtration by slurrying the recovered fines with added oil which would essentially be the filtrate or its equivalent in *Owen*. Moreover, the teaching in *Owen* that it is preferred to remove the fines by forwarding the slurry to the main column, where existing technologies are in place to remove the fines, teaches squarely away from applicant's invention, in which the fines are recovered and fuel oil or quench oil is added to form a reconstituted fines slurry.

Regarding new claim 19, *Owen* does not teach or suggest the slurrying of the recovered fines, as discussed above, nor does *Owen* teach or suggest forwarding the slurry to the regenerator to supply fuel for the regeneration process. *Owen* merely suggests removing the fines and does not consider the recycling of the fines to the regenerator for further use in the FCC process.

Stegelman teaches a filtration process for removal of catalyst particles from a liquid hydrocarbon fraction in a catalytic cracking process. The filtration process includes backflushing the filters with unfiltered slurry oil (column 6, lines 6 -- 10).